CHE-331 FP: FIELD PROJECT

Course Type: FP **Credits: 2**

A. Course Objectives:

1. To apply fundamental chemistry concepts to environmental and real-life problems.
2. To develop understanding of field-based chemical investigation methodologies and sampling techniques.
3. To impart practical knowledge of scientific experimentation, sample collection, and data recording.
4. To develop analytical skills for interpretation of experimental and survey data.
5. To encourage scientific evaluation of local environmental and chemical problems and suggest chemistry-based solutions.
6. To develop scientific report writing, presentation, and communication skills.
7. To inculcate ethical practices, safety awareness, and professional conduct during fieldwork and research activities.

B. Course Outcomes (COs):

CO No.	Course Outcome Statement (COs) *After learning the course, the students are able to -*
CO-1	Recall basic chemistry concepts related to environmental and field-based studies.
CO-2	Explain methodologies, sampling techniques, and procedures used in field-based chemical investigations.
CO-3	Apply standard laboratory and field techniques for sampling, experimentation, and data collection.
CO-4	Analyze experimental and survey data to interpret chemical and environmental conditions scientifically.
CO-5	Evaluate local environmental or chemical problems and suggest suitable chemistry-based solutions.
CO-6	Design and prepare scientific reports, presentations, and project documentation based on field/research findings.

C. Contents:

1. Introduction

The Field (FP) is an integral component of the T.YB.Sc. Chemistry curriculum designed to promote experiential learning, scientific inquiry, and independent thinking among students. The project work transforms the teaching-learning process into a purposeful and application-oriented activity.

The project may be:

- Field-based,
- Experimental,
- Survey-based,
- Community-oriented,
- Industry-oriented, or
- Research-oriented,

provided that chemistry remains the core discipline.

The project enables students to apply theoretical chemistry concepts to real-life environmental, industrial, agricultural, medicinal, and societal problems. It also develops analytical, experimental, organizational, communication, and scientific writing skills.

Students are expected to devote a minimum of 60 hours toward:

- Planning,
- Literature survey,
- Field visits,
- Sample collection,
- Laboratory work,
- Data analysis,
- Report writing, and
- Presentation.

2. Objectives of the Field

The major objectives of the project course are:

1. To apply chemistry principles to real-world problems and local environmental conditions.
2. To develop practical laboratory and field investigation skills.
3. To enhance research aptitude and scientific temper.
4. To train students in:

- Sampling techniques,
- Data collection,
- Analytical methodologies,
- Statistical interpretation, and
- Scientific reporting.

5. To encourage independent learning and critical thinking.
6. To improve problem-solving abilities using chemistry-based approaches.
7. To understand ethical research practices and avoid plagiarism.
8. To strengthen communication and presentation skills.
9. To develop awareness regarding green chemistry and sustainable practices.
10. To encourage creativity and innovation in chemistry applications.

3. Nature of the Project

The project may involve:

- Experimental studies,
- Field investigations,
- Community surveys,
- Industrial visits,
- Product analysis,
- Environmental monitoring,
- Awareness campaigns,
- Comparative studies,
- Mini research projects.

Projects should preferably include:

- At least one field visit,
- Data collection,
- Experimental/laboratory work,
- Interpretation of findings,
- Scientific discussion.

4. Suggested Project Themes (Chemistry-Oriented)

Students may select any chemistry-related topic approved by the department.

A. Environmental Chemistry

- Water quality analysis of local sources
- Drinking water contamination studies
- Soil pH and nutrient analysis

- Heavy metal analysis
- Air quality monitoring
- Plastic pollution studies
- E-waste management survey
- Rainwater quality assessment

B. Industrial Chemistry

- Study of local chemical industries
- Effluent analysis
- Industrial wastewater treatment
- Chemical safety practices
- Sugar, dairy, fertilizer, soap, or paint industry studies

C. Food and Consumer Chemistry

- Food adulteration analysis
- Comparative analysis of edible oils
- Testing of soaps, detergents, shampoos
- Cosmetic product analysis
- Household chemical hazard studies

D. Agricultural Chemistry

- Fertilizer and pesticide usage survey
- Soil fertility studies
- Organic farming awareness
- Biofertilizer studies

E. Herbal and Medicinal Chemistry

- Phytochemical screening
- Herbal medicine survey
- Preparation of herbal formulations
- Traditional chemical practices

F. Green Chemistry and Sustainability

- Eco-friendly products
- Natural indicators and dyes
- Green synthesis approaches
- Biodegradable materials

G. Community Chemistry

- Chemistry awareness campaigns

- Water purification awareness
- Safe handling of household chemicals
- Public awareness regarding environmental pollution

H. Any Other Chemistry-Oriented Topic

Interdisciplinary projects are permitted provided chemistry is the central component.

5. Orientation Programme

At the beginning of the semester, the department shall organize an orientation programme covering:

- Nature of projects,
- Types of projects,
- Report writing,
- Evaluation methods,
- Ethical practices,
- Safety guidelines,
- Timeline and submission procedures.

6. Selection and Approval of Topic

Topic Selection Criteria

The topic should:

- Be chemistry-based,
- Be scientifically relevant,
- Address a practical/local issue,
- Be feasible within available facilities,
- Encourage analytical thinking and creativity.

Proposal Submission

Students should submit:

- Title of project,
- Objectives,
- Proposed methodology,
- Expected outcomes,
- Tentative work plan.

Approval Procedure

- Faculty mentor approval,
- Final approval by HOD/Project Coordinator.

7. Implementation Strategy

Responsibilities of Head of Department (HOD)

The HOD shall:

- Confirm student registrations,
- Monitor project progress,
- Maintain departmental records,
- Appoint examiners for presentations/viva.

Responsibilities of Project Coordinator

The coordinator shall:

- Assign supervisors,
- Monitor schedules,
- Ensure timely completion,
- Coordinate presentations and evaluations.

Responsibilities of Faculty Mentor

The mentor shall:

- Guide students throughout the project,
- Monitor attendance and participation,
- Verify field visits and experimental work,
- Maintain records of discussions and progress,
- Assist in data interpretation and report writing,
- Conduct pre-submission review.

Responsibilities of Students

Students shall:

- Conduct work sincerely and ethically,
- Maintain regular interaction with mentor,
- Follow safety procedures,
- Submit reports on time,
- Participate in viva/presentation.

8. Project Workflow

Step 1: Topic Finalization

- Identification of research/problem area.

Step 2: Literature Review

- Study books, journals, research articles, websites.

Step 3: Planning and Methodology

- Design sampling methods,

- Prepare questionnaires/survey forms,
- Identify instruments and chemicals required.

Step 4: Field Visit and Data Collection

- Minimum one field visit is mandatory.
- Collect samples/data systematically.
- Maintain field diary.
- Take photographic/video evidence.

Step 5: Experimental/Laboratory Work

- Conduct chemical analysis,
- Record observations carefully,
- Follow standard procedures.

Step 6: Data Analysis and Interpretation

- Use tables, graphs, charts,
- Compare findings with standards/literature.

Step 7: Report Writing

- Prepare report in prescribed format.

Step 8: Presentation and Viva

- Oral or poster presentation,
- Viva voce examination.

9. Ethical and Safety Guidelines

Students must:

- Follow laboratory safety norms,
- Wear PPE during field/laboratory work,
- Respect community and environmental ethics,
- Obtain permissions where necessary,
- Avoid data fabrication,
- Strictly avoid plagiarism.

10. Fieldwork Documentation

Students should maintain:

- Attendance records,
- Field diary,
- Observation notebook,
- Raw data sheets,
- Sample labels,

- Laboratory notebook,
- Photographs/videos with captions.

11. Style and Format of Project Report

General Formatting

- Paper Size: A4
- Font: Times New Roman
- Font Size: 12 pt
- Line Spacing: 1.5
- Margins: 1 inch on all sides
- Typing: One side only
- Language: English

Submission Copies

- Two hard copies
- One soft copy (PDF)

12. Structure of the Project Report

Preliminary Pages

1. Title Page
2. Certificate by Institute
3. Certificate by Mentor
4. Student Declaration
5. Acknowledgement
6. Abstract (200–300 words)
7. Table of Contents
8. List of Figures and Tables

13. Chapter Scheme

Chapter 1: Introduction (5–6 Pages)

Include:

- Background,
- Problem statement,
- Need and significance,
- Aim and objectives,
- Scope of study.

Chapter 2: Review of Literature (5–6 Pages)

Include:

- Previous research work,
- Related scientific studies,
- Comparative analysis.

Chapter 3: Materials and Methods / Methodology (5–7 Pages)

Include:

- Study area,
- Chemicals and instruments,
- Sampling methods,
- Experimental procedures,
- Survey methods,
- Statistical tools.

Chapter 4: Results and Discussion (8–10 Pages)

Include:

- Tables,
- Graphs,
- Charts,
- Observations,
- Data interpretation,
- Comparative discussion.

Chapter 5: Conclusion (1–2 Pages)

Include:

- Summary of findings,
- Outcomes,
- Recommendations,
- Future scope.

References/Bibliography

Use standard referencing styles:

- ACS Style (Preferred),
- APA,
- Vancouver.

Minimum 10 references recommended.

Appendices (Optional)

May include:

- Raw data,

- Survey forms,
- Permissions,
- Additional calculations,
- Photographs.

14. Minimum Length of Report

The report should contain:

- Minimum 15 typed pages (excluding title page, certificates, index, acknowledgement, etc.)

15. Evaluation Pattern

Total Marks: 50

A. Internal Evaluation by Guide – 15 Marks

Criteria	**Marks**
Field Visit Completion, Attendance & Interaction	07
Presentation in poster/project competitions/workshops/conferences, etc	08
Total	**15**

B. External Evaluation – 35 Marks

Criteria	**Marks**
Objectives, Literature Review, Methodology, Data Analysis	10
Conclusion and Recommendations	05
Overall Report Structure and Style	10
Presentation Skills & Communication	10
Total	35

16. Viva Voce Guidelines

Students should be able to explain:

- Project objectives,
- Methodology,
- Chemistry concepts involved,
- Experimental procedures,
- Data interpretation,
- Conclusions and recommendations.

All group members must appear for viva separately.

17. Important Instructions

- Plagiarism is strictly prohibited.
- Proper citations and references are mandatory.
- Fabrication or manipulation of data is not allowed.
- Safety measures must be followed throughout the project.
- Students are encouraged to present their work in seminars, exhibitions, and conferences.